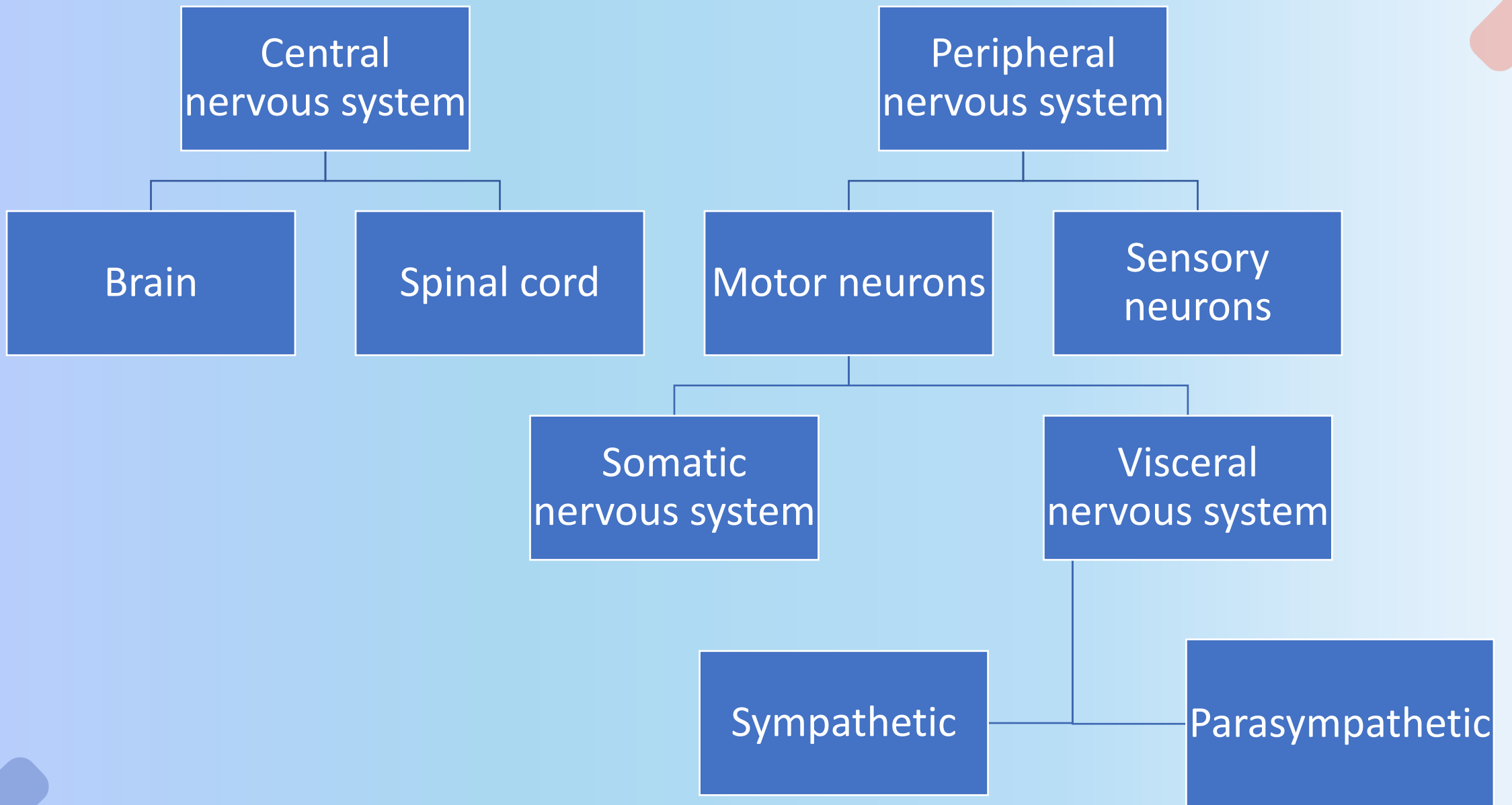


Parasympathetic ganglia

By Gustav Emil Dietrichson

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- ❖ Autonomic nervous system supply smooth muscle cells and glands

Both affect the viscera!
Internal organs

Parasympathetic

1. Originates in the cranial and sacral region
2. Long presynaptic neuron
3. Postsynaptic neuron releases acetylcholine
4. Produces saliva, constricts the pupil (miosis), and decreases heart rate

Sympathetic

1. Originates in the thoracolumbar region
2. Short presynaptic neuron
3. Postsynaptic neuron releases norepinephrine
4. Inhibits saliva, dilates pupil (mydriasis), increases heart rate

WHAT is a ganglion

- A group of cell bodies in the peripheral nervous system
- Well, wtf is the difference between a ganglion and a nucleus????
LOCATION
- A group of cell bodies are called a nucleus in the central nervous system, and a ganglion in the peripheral nervous system

The clusterfuck of types of nerves

GVA

GSA

GVE

GSE

SVA

SSA

SVE

Types of nerves

- General visceral afferent
- General visceral efferent
- General somatic afferent
- ~~General somatic efferent~~
- ~~Special visceral afferent~~
- ~~Special visceral efferent~~
- ~~Special somatic afferent~~

ALL GANGLIA HAVE THREE ROOTS

1. Parasympathetic (GVE)
2. Sympathetic (GVE)
3. Sensory (GSA)



	Type		Effect
"Autonomic"	General visceral afferent	CN VII, IX, X	Send sensory impulses from internal (visceral) organs to the CNS
Autonomic	General visceral efferent	CN III, VII, IX, X	Send motor impulses to smooth muscle, cardiac muscle, and glandular tissue
Normal sensory	General somatic afferent		Transmit pain, temperature, touch, and proprioception from the body to the CNS
Normal motor	General somatic efferent		Send motor impulses to the skeletal (voluntary) muscles of the body
	Special visceral afferent		Transmit smell and taste to the CNS
	Special visceral efferent		Send motor impulses to the muscles developing from the pharyngeal arches
	Special somatic afferent		Send signals of vision, hearing and balance to the CNS



These cranial nerves carry parasympathetic fibers

1973

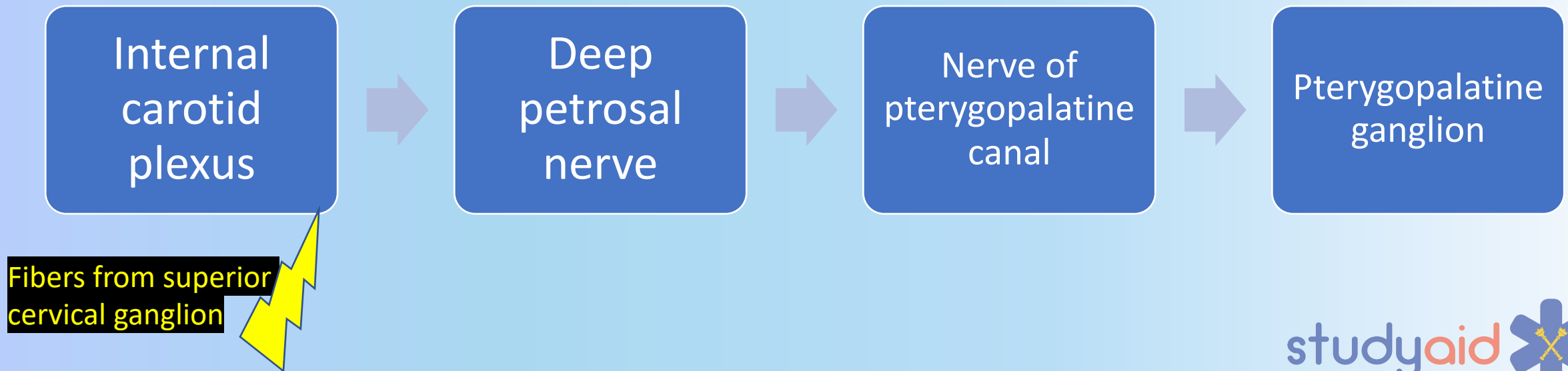
- CN III → Ciliary ganglion
- CN VII → Pterygopalatine and submandibular ganglion
- CN IX → Otic ganglion
- CN X → A billion plexuses

Which ganglia??

1. Superior cervical ganglion
2. Ciliary ganglion
3. Pterygopalatine ganglion
4. Submandibular ganglion
5. Otic ganglion

Superior cervical ganglion

1. ALL presynaptic sympathetic nerves to the head & neck synapse here, and they **NEVER synapse before reaching the target!**
2. Originate in T1-T6 enter the sympathetic trunk and ascend
3. Postsynaptic hitchhike with the carotids
4. Sympathetic trunk is located posterior to CCA, follow the trunk superior until it dilates in the region of ICA.



Chin



Ciliary ganglion

Sensory root

Nasociliary nerve
of CN V1

Parasympathetic root

CN III – Edinger-
Westphal
nucleus

Sympathetic root

Internal carotid
plexus – Superior
cervical ganglion

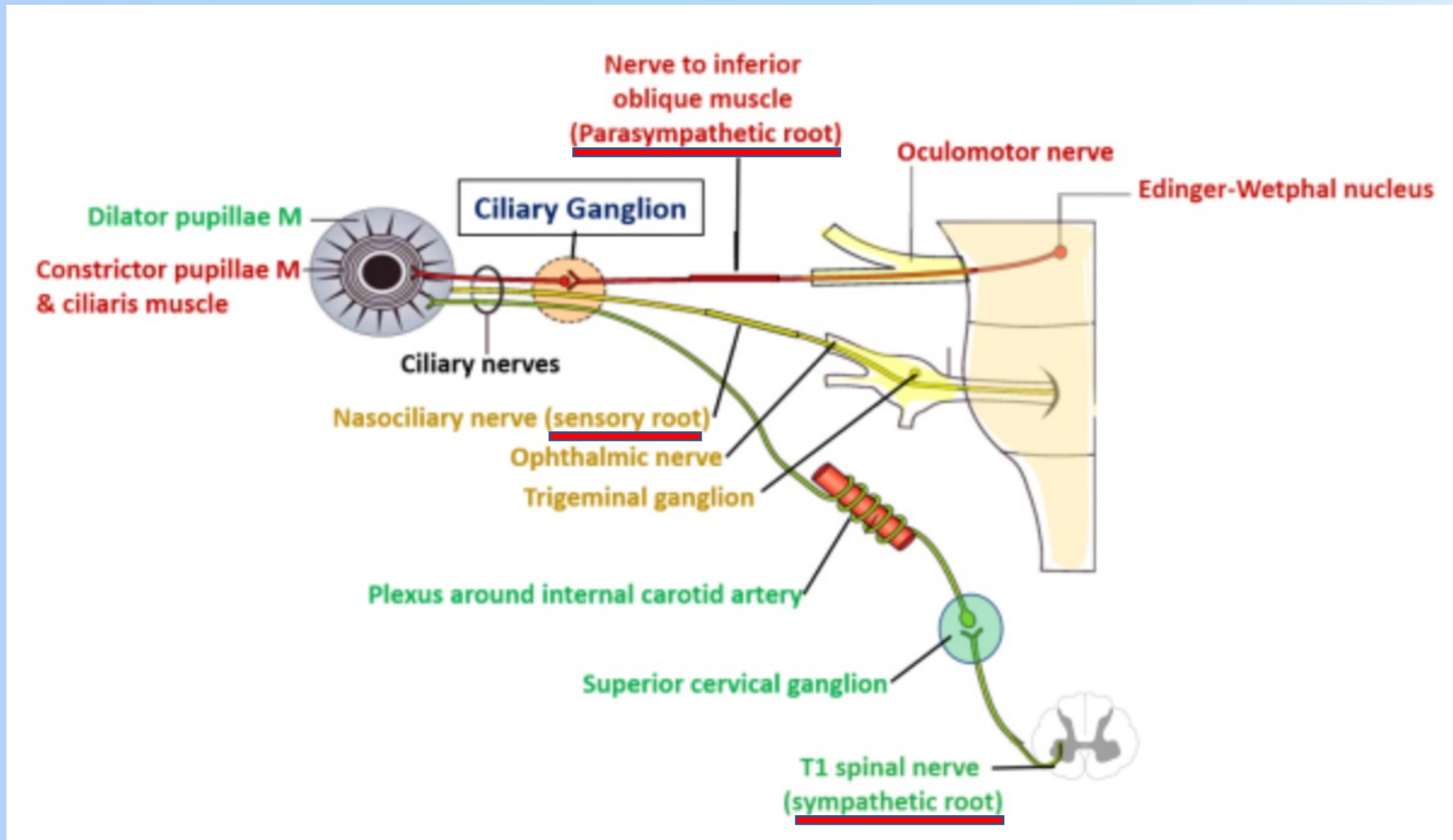
Never synapse after SCG

Ciliary ganglion

Short ciliary
nerves

Deliver symp and
parasymp fibers to the
structures of the eye

Roots and connections of ciliary ggl



Pterygopalatine ganglion

Sensory root

Pterygopalatine
nerve of CN V2

Parasympathetic root

Nerve of pterygoid
canal (Vidian nerve) –
CN VII – Sup.
Salivatory nucleus

Sympathetic root

Nerve of pterygoid
canal (Vidian nerve)
– CN VII – Superior
cervical ganglion

Pterygopalatine
ganglion

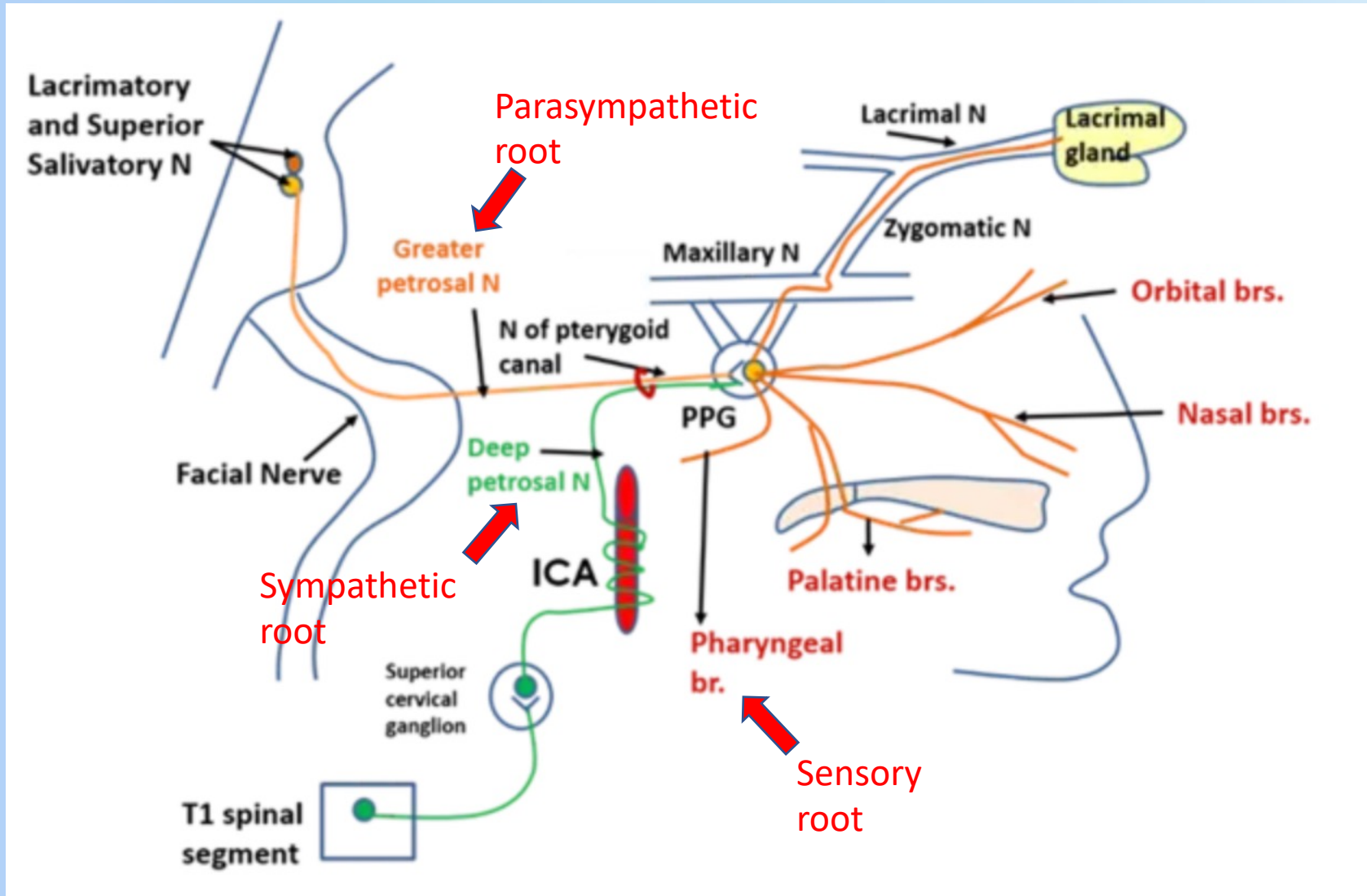
Greater- and lesser
palatine nerve,
nasopalatine nerve

Deliver symp and
parasymp fibers to:

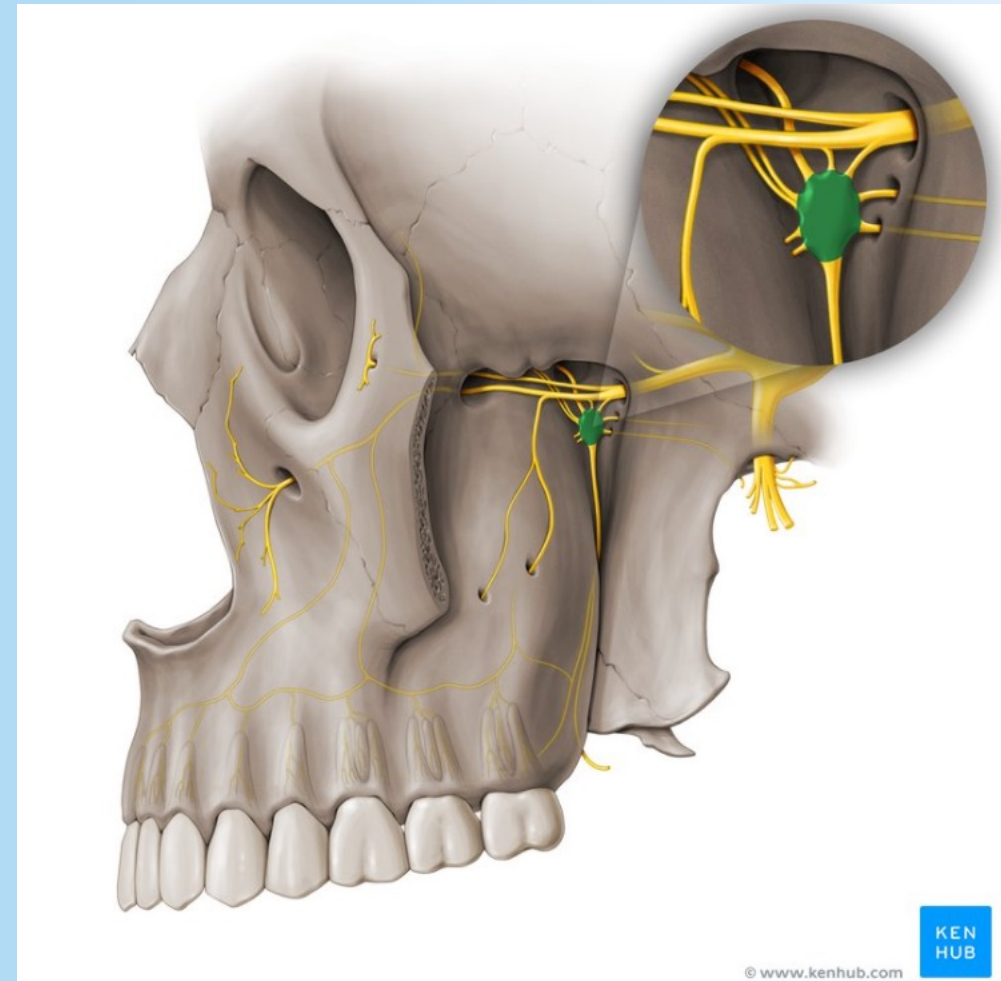
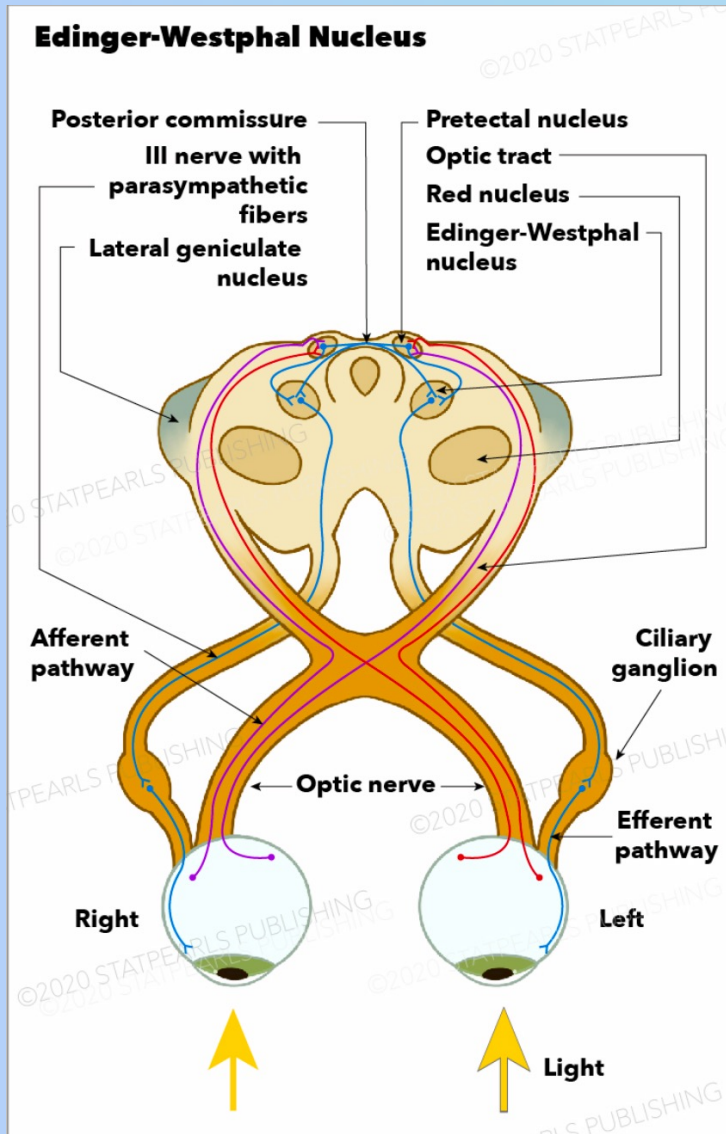
Lacrimal gland, paranasal
sinuses, glands of nasal
cavity, pharynx and gingiva

Never synapse after SCG

Roots and connections of pterygopalatine ggl



Ciliary- and pterygopalatine ganglion



Submandibular ganglion

Sensory root

Lingual nerve of
CN V3

Parasympathetic root

Chorda tympani –
CN VII – sup.
Salivatory nucleus

Sympathetic root

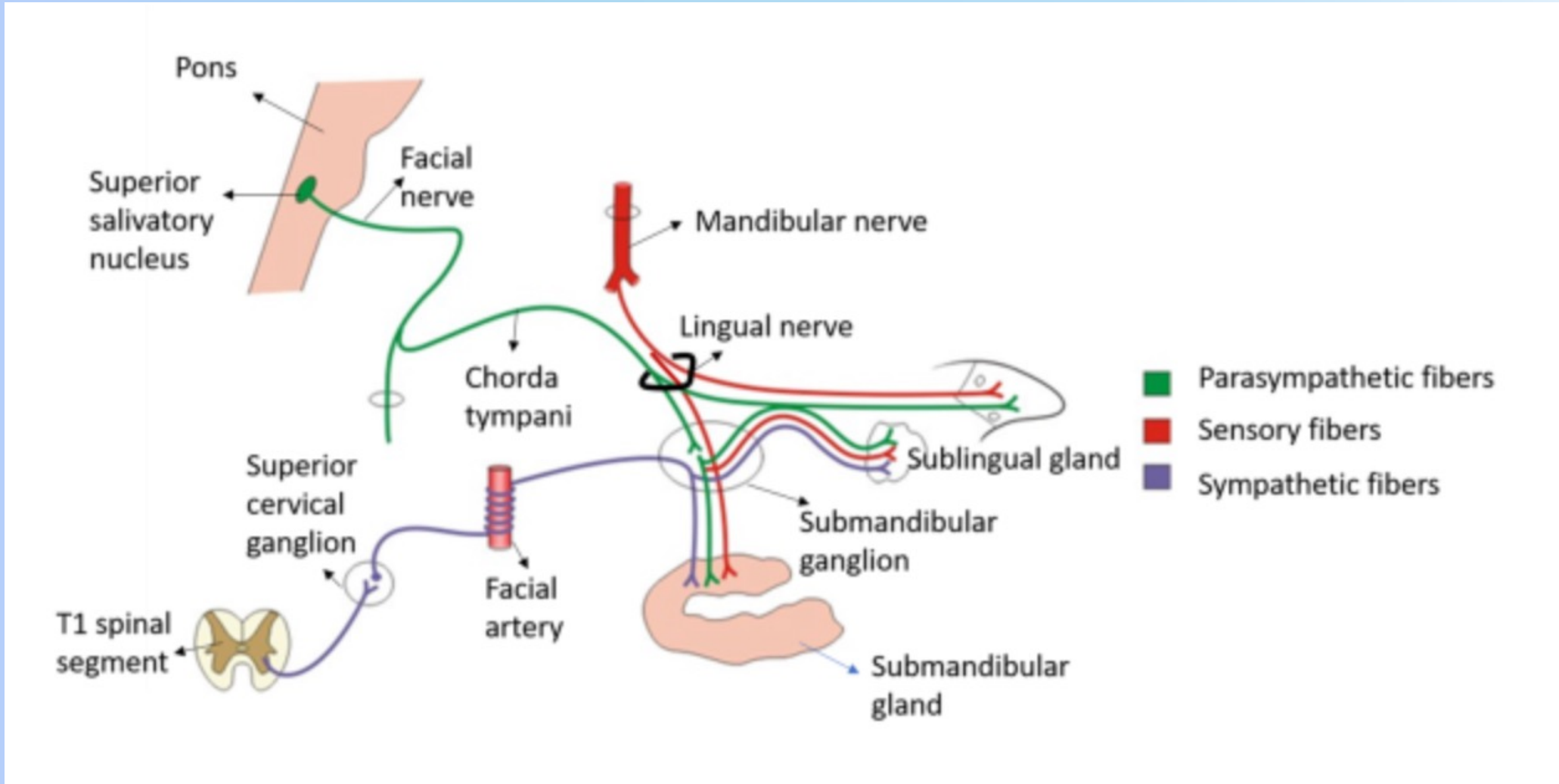
Deep petrosal
nerve – Superior
cervical ganglion

Never synapse after SCG

Submandibular
ganglion

Deliver symp and
parasymp fibers to the
submandibular and
sublingual gland

Roots and connections of submandibular ggl



Otic ganglion

Sensory root

Auriculotemporal nerve of CN V3

Parasympathetic root

Lesser petrosal nerve of CN IX – Inf. Salivatory nucleus

Sympathetic root

Middle meningeal plexus – Superior cervical ganglion

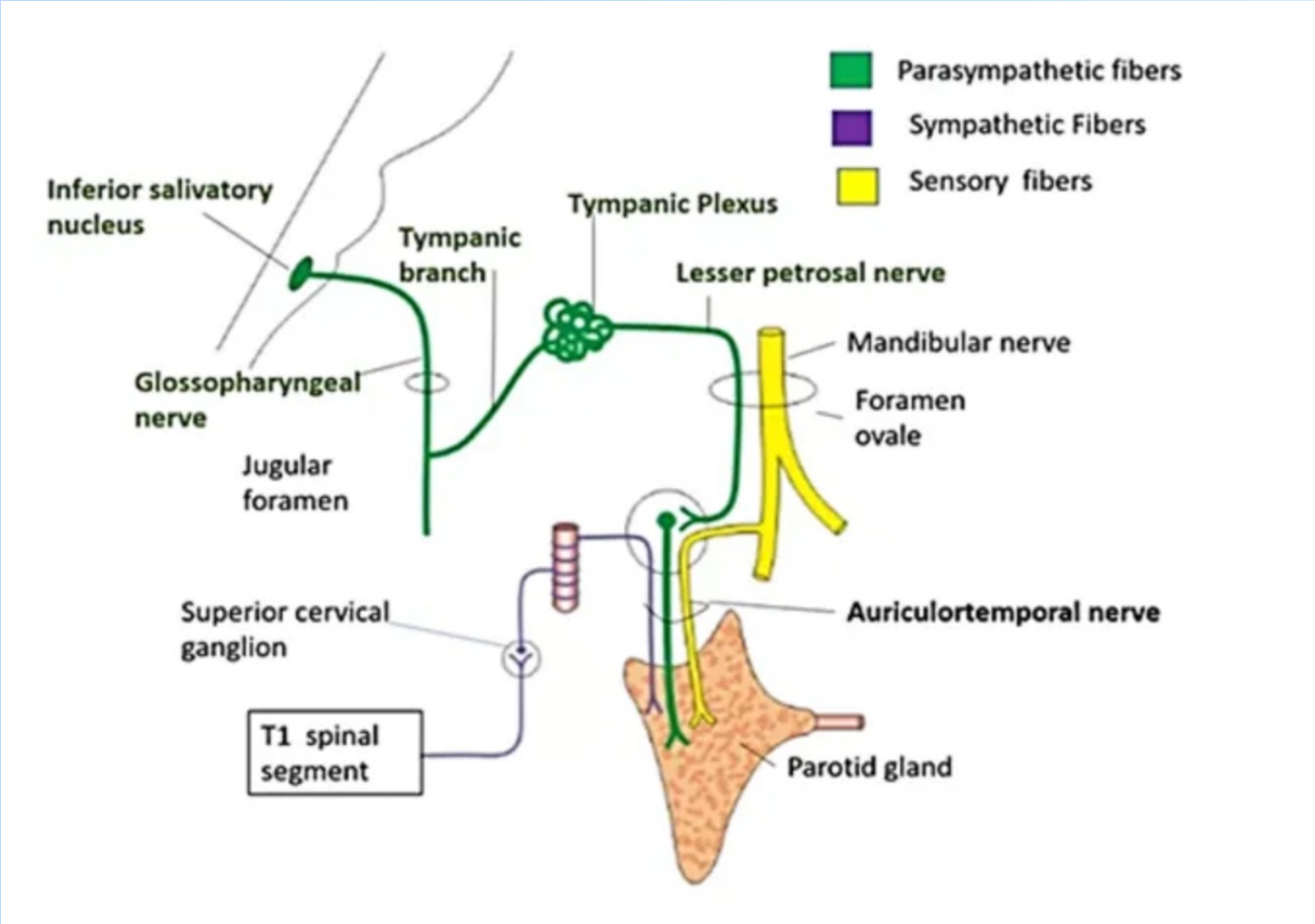
Never synapse after SCG

Otic ganglion

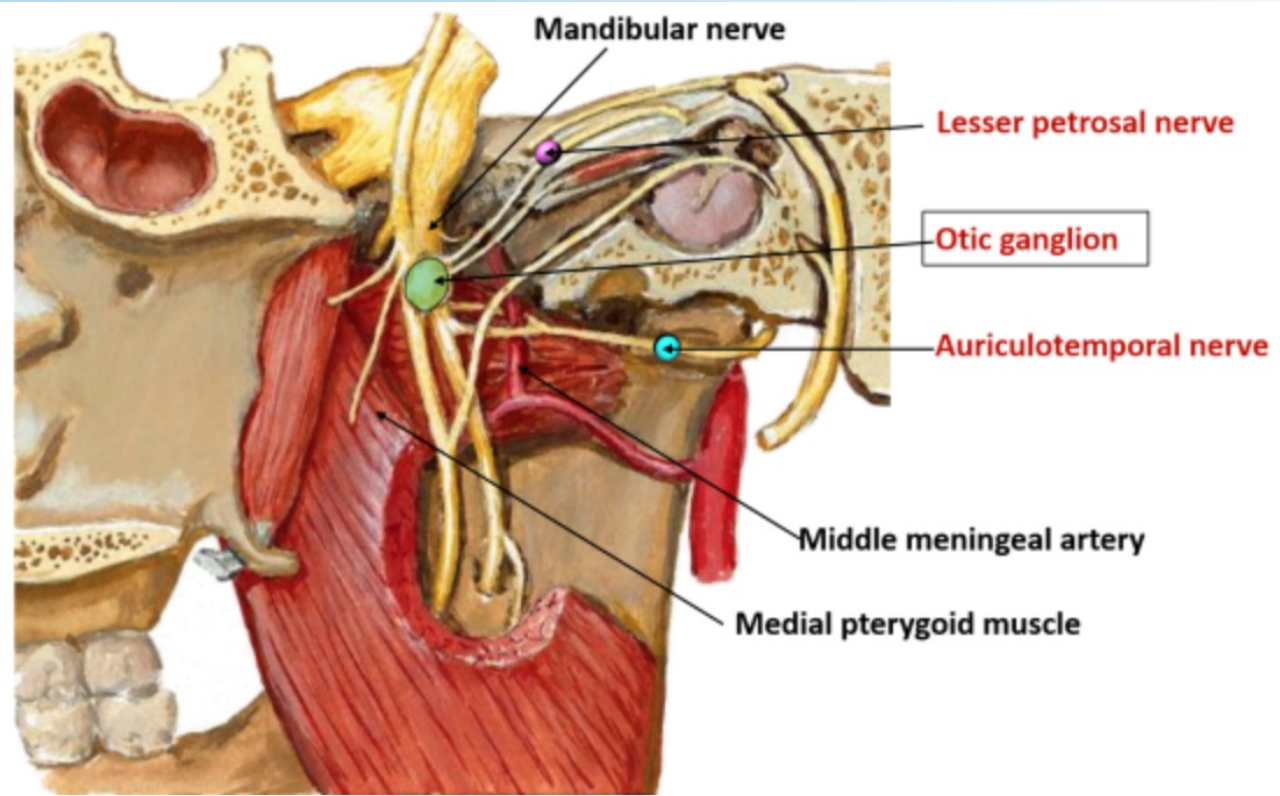
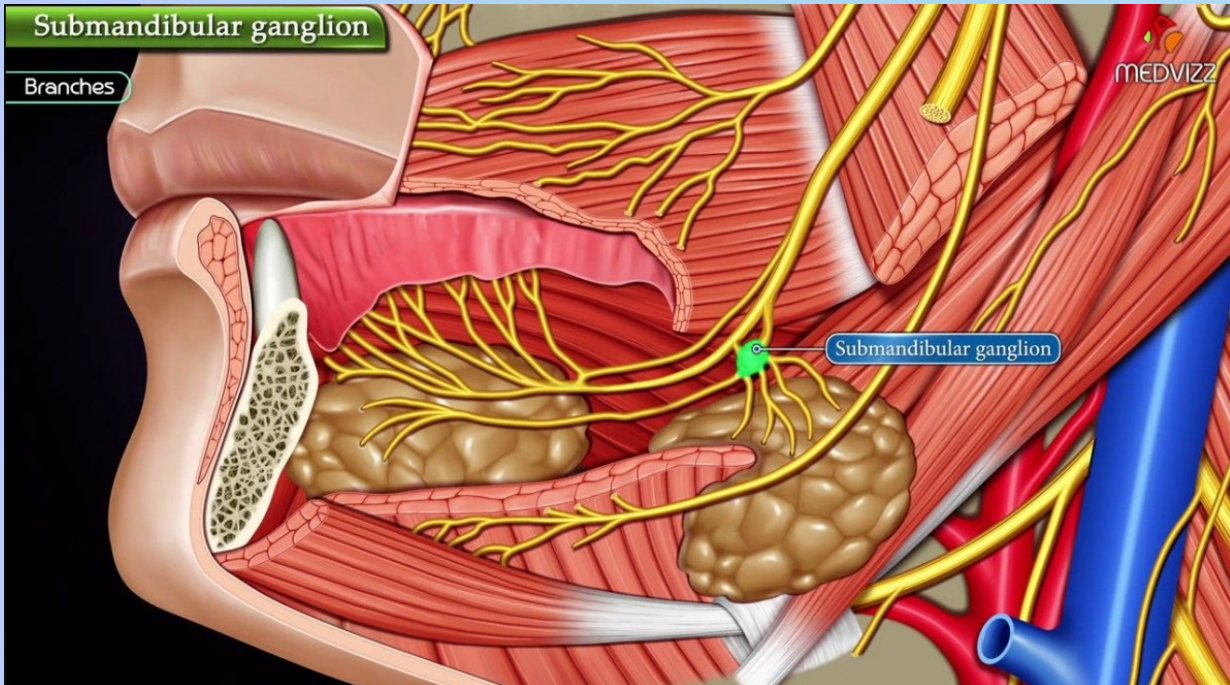
Auriculotemporal nerve of CN V3

Deliver symp and parasymp fibers to the parotid gland

Roots and connections of otic ggl



Submandibular- and otic ganglion



	Ciliary ganglion	Pterygopalatine ganglion	Submandibular ganglion	Otic ganglion
Sensory root	Nasociliary nerve of CN V1	Pterygopalatine nerve of V2	Lingual nerve of CN V3	Auriculotemporal nerve of CN V3
Parasympathetic ganglion	CN III – Edinger Westphal nucleus	Vidian nerve of CN VII – sup. Salivatory nucleus	Chorda tympani of CN VII – sup. Salivatory nucleus	Lesser petrosal nerve of CN IX – Inf. Salivatory nucleus
Sympathetic ganglion	Internal carotid plexus – sup. Cervical ganglion	Vidian nerve of CN VII – sup. Cervical ganglion	Deep petrosal nerve – sup. Cervical ganglion	Middle meningeal plexus – sup. Cervical ganglion

Deep petrosal (Symp)
+ Greater petrosal (Para)
= Vidian nerve